

What is claimed is:

- 1 1. A method of forming shallow trench isolation regions comprising the steps of:  
2 forming a plurality of active regions on a silicon substrate;  
3 forming a shallow trench isolation region between a first and a second active region  
4 from among the plurality of active regions; and  
5 selectively depositing silicon dioxide in the shallow trench isolation region without  
6 depositing the silicon dioxide on the first and second active regions.
- 1 2. The method according to claim 1, wherein the depositing step is performed by liquid  
2 phase deposition of the silicon dioxide.
- 1 3. The method according to claim 1, wherein the silicon substrate includes:  
2 a silicon substrate;  
3 a buried oxide layer on the silicon substrate; and  
4 a silicon-on-insulator layer on the buried oxide layer.
- 1 4. The method according to claim 3, further comprising the step of:  
2 forming a pad oxide layer on the silicon-on-insulator layer.
- 1 5. The method according to claim 4, wherein the pad oxide layer has a thickness of between  
2 approximately 2 - 10 nm.
- 1 6. The method according to claim 3, further comprising the step of forming a pad nitride  
2 layer.
- 1 7. The method according to claim 6, wherein the pad nitride layer has a thickness of between  
2 approximately 10 - 150 nm.

- 1     8. The method according to claim 1, further comprising the step of:  
2             cleaning the shallow trench isolation region before performing the selective  
3     depositing step.
- 1     9. The method according to claim 8, wherein the step of cleaning reduces an amount of  
2     native oxide present along each exposed wall of the shallow trench isolation region.
- 1     10. The method according to claim 6, wherein the shallow trench isolation region extends  
2     through the pad nitride layer and the silicon-on-insulator layer to reach the buried oxide  
3     layer.
- 1     11. The method according to claim 10, wherein the selective depositing of silicon dioxide  
2     includes the step of:  
3             depositing the silicon dioxide so that the silicon dioxide nucleates on and grows from  
4     the buried oxide layer.
- 1     12. The method according to claim 1, further comprising the steps of:  
2             overfilling the shallow trench isolation region with an excess amount of silicon  
3     dioxide; and  
4             planarizing the shallow trench isolation region by removing the excess amount.
- 1     13. The method according to claim 1, further comprising the step of:  
2             processing the selectively deposited silicon dioxide to change its density to one  
3     substantially similar to that of thermally grown silicon dioxide.
- 1     14. The method according to claim 13, wherein the step of processing includes the step of  
2     annealing the selectively deposited silicon dioxide at a temperature between approximately  
3     800-1200C.

- 4     15. A semiconductor device forming area on a silicon-on-insulator substrate comprising:  
5             a first active region and a second active region;  
6             a shallow trench isolation region separating the first and second active regions; and  
7             liquid-phase deposited silicon dioxide (LPD-SiO<sub>2</sub>) filling the shallow trench isolation  
8     region.

1 16. A semiconductor device forming area on a silicon-on-insulator substrate comprising:  
2 a first active region and a second active region;  
3 a shallow trench isolation region separating the first and second active regions; and  
4 an electrically-insulative material filling the shallow trench isolation region, the  
5 electrically-insulative material comprised substantially of silicon dioxide and having a  
6 uniform etch rate when exposed to wet etching solution.

1 17. The semiconductor device forming area of claim 16, wherein the wet etching solution  
2 is one of DHF and BHF.

1 18. The semiconductor device forming area of claim 16, wherein the electrically-insulative  
2 material is liquid-phase deposited silicon dioxide (LPD-SiO<sub>2</sub>).

1 19. A method of forming shallow trench isolation regions comprising the steps of:  
2 forming a plurality of active regions on a silicon substrate;  
3 forming a shallow trench isolation region between a first and a second active region  
4 from among the plurality of active regions; and  
5 selectively depositing silicon dioxide in the shallow trench isolation region by liquid  
6 phase deposition of the silicon dioxide.

1 20. The method according to claim 19, wherein the step of depositing silicon dioxide avoids  
2 depositing silicon dioxide on the first and second active regions.

1 21. The method according to claim 20, wherein the silicon substrate includes:  
2 a silicon substrate;  
3 a buried oxide layer on the silicon substrate; and  
4 a silicon-on-insulator layer on the buried oxide layer.